

APALACHICOLA RIVER AND BAY WATERSHED EXPLORATIONS

Apalachicola National Estuarine Research Reserve



Apalachicola National Estuarine Research Reserve

Florida Department of Environmental Protection

261 7th Street

Apalachicola, FL 32320

850-653-8063

June 2004

ACKNOWLEDGMENTS

Apalachicola River and Bay Watershed Explorations is a cooperative project between the Friends of the Reserve, Inc. and the Apalachicola National Estuarine Research Reserve. Financial support for this publication was provided by the Florida Department of Environmental Protection and a grant under the Federal Coastal Zone Management Act, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, Silver Spring, MD.

Project director: Erik Lovestrand, Education Coordinator, Apalachicola National Estuarine Research Reserve with assistance from Lisa Bailey, Reserve Education Specialist

Curriculum writing and design: Lauren Tyler, Christine Denny, and Susan Marynowski- Pandion Systems, Inc.

We appreciate the assistance of several Franklin and Gulf County, Florida teachers in planning this curriculum. Their input and feedback was an integral part of the design process.

Thank you to:

JoAnn Ardire, Polly Edmiston, Fay Henderson, Teresa Howard, Andrea Keuchel, Diane McGrath, LeeAnne Poloronis, Pam Schaffer, Gina Taranto, and Carol Weyrich

For more information or to obtain a copy of this curriculum contact:

Erik Lovestrand, Education Coordinator

Apalachicola National Estuarine Research Reserve

Erik.Lovestrand@dep.state.fl.us

261 7th Street

Apalachicola, FL 32320

850-653-8063





HABITAT DETECTIVES

CONCEPT

Students will classify habitats and take measurements of various ecosystem clues.

OBJECTIVES

Students will be able to:

1. Define various habitats/communities in the Apalachicola River watershed: the pine forest, the hardwood swamp, the salt marsh, the river, the estuary, and the beach.
2. Identify at least three organisms in each habitat/community and understand the adaptations that allow those organisms to thrive there.
3. Identify abiotic factors and illustrate how they affect a habitat.

METHOD

Each group of students will be given a box with clues for five different habitats. Students will have to measure and sort each clue to create a complete understanding of each habitat.

Grade level: 5th Grade

Subjects: Science, Social Studies, Language Arts, Mathematics

Location: The activity can be done in the classroom or in a lab if available

Materials: TV and VCR, Items in the Activity Module

Duration: This activity will take 3 class periods, including pre-activity

Sunshine State Standards: Listed on p. 5 of the activity

ACTIVITY SCENARIO:

A **habitat** is a place where a plant or animal lives. The habitat provides food, water, shelter, and space in a suitable arrangement. There are six major habitats found in the Apalachicola River **watershed** that will be the focus of this activity: the pine forest, the salt marsh, the hardwood swamp, the river, the **estuary**, and the beach.

Abiotic factors, the non-living components of a habitat influence the kinds of plants and animals that are able to live in certain areas. Soil type and **permeability**, water

temperature and **salinity**, sunlight exposure and **turbidity** are all abiotic factors that affect the ability for organisms to survive in specific habitats. Each organism has developed specific **adaptations** to enable their survival. Students can read through the information fact sheets included with this lesson to learn more about the adaptations of plants and animals.

PREPARATION ACTIVITIES:

1. Read and then hand out the passages provided to give students the background to the activity.

2. Watch a video that shows the various habitats that the students will be studying. The video will cover the topic of watersheds. Students will also receive reading passages that will discuss each habitat, and an information sheet about abiotic factors. Students can read through these on their own or together as a class.
3. List the 6 habitats on the chalkboard leaving a space for answers. Ask students to give some characteristics for each habitat. The teacher or a designated student can list the characteristics under the correct habitat.
4. After the class has discussed each habitat, the teacher should post the habitat posters around the room and the group can then discuss any discrepancies with what the class listed on the board. Discuss each poster to gain an understanding of each habitat.

GETTING READY:

1. The teacher will need to prepare five water samples for the students to test. Each sample will be divided into 100 ml samples for each group. Water “recipe” cards are included with the teacher’s guide.
2. Each team will need a microscope or an assigned time to use to the microscope station.
3. Each group will receive a kit that will contain 30 plant and animal artifacts/cards, 10 abiotic factor cards, 6 prepared soil samples, and 5 prepared 100 ml water samples (excluding uplands, there will be a note “There is no permanent standing water in this habitat, but this habitat does

require freshwater for growth.”) and data sheets.

4. Each card or artifact will have clues associated with it to help them sort each into the correct habitat. Some of the plants or animals may be found in more than one habitat. Groups can receive bonus points if they sort it into all appropriate habitats.

ACTIVITY:

1. Students will first review their project management sheet and confirm the tasks that each scientific team member will complete. If one team member completes their task they should check in with other team members to see who needs additional help.
2. Each group will work to sort each of the artifacts/cards into the correct habitat. They will use the clues on the cards and the habitat posters to help them determine the correct choice.
3. To sort the water samples and soil samples into the correct habitat, there will be a reference key and the habitat posters to help the students identify the habitat that each sample belongs to. Students will record their answers on data sheets that will be provided to each group.
4. The teacher should facilitate by walking around the classroom and offering assistance to each group. There will be an answer key that has all of the possible choices for each artifact/clue.
5. At the end of the period, each group will summarize their individual findings onto the “final habitat descriptions” for each habitat.



FOLLOW-UP:

Have a classroom discussion covering the following questions:

1. What are some of the unique characteristics of each habitat?
2. Why were some of the plants and animals able to live in more than one of the habitats?
3. Name a plant adapted to life in the salt marsh and explain how its adaptations enable it to survive there.
4. Name three animals or plants and explain how they are adapted to life on the beach.
5. What role do you think these habitats play in the overall health of the Apalachicola River watershed?

ASSESSMENT:

Team Assessment

1. Students will turn in their team data sheets for assessment. Each student group should also complete a brief description page that ties all of the pieces together. These description sheets are included with the data sheets.

Individual Assessment

1. Students will answer the wrap up questions via homework or quiz.
2. Students will complete the *Fashion a Fish* or *Build a Bird* from Project Aquatic Wild. Encourage students to be creative. They can draw pictures or create three-dimensional models of their creature.
3. Students can identify the location of the habitats on an Apalachicola River watershed map, list habitat abiotic characteristics, and identify some of the plants and animals that live there.

POST ACTIVITIES:

- Fashion a fish or Build a Bird from Project Aquatic Wild with descriptions about the appropriate habitat.



RESOURCES:

For teachers:

- *Florida Waters: A Water Resources Manual from Florida's Water Management District* (Chapters 3 and 4)
- *Ecosystems of Florida*, Ronald L. Myers and John J. Ewel, eds.
- Florida Natural Areas Inventory ecosystem information
<http://www.fnai.org/>
- Bottomland hardwoods description on the Florida 4-H Forest Ecology website:
[http://www.sfrc.ufl.edu/4h/Ecosystems/Bottomland Hardwoods/bottomland_hardwoods.html](http://www.sfrc.ufl.edu/4h/Ecosystems/Bottomland%20Hardwoods/bottomland_hardwoods.html)
- Apalachicola Water Quality information (to 2002)
<http://cdmo.baruch.sc.edu/apa.html>

For students:

- Office of Naval Research Oceanography information page:
<http://www.onr.navy.mil/focus/ocean/motion/default.htm>
- *The Handbook to Schoolyard Plants and Animals of North Central Florida*, Florida Fish and Wildlife Conservation Commission

VOCABULARY

Abiota (abiotic): The non-living component of an habitat. Abiotic components include air, soil, and water.

Adaptation(s): An alteration or change in structure or function of a plant or animal over successive generations that aids it in being better suited to live in its environment.

Beach: The point where the land meet the sea (e.g., Gulf of Mexico). The beach is in a constant state of motion due to wave action and currents.

Estuary: Unique coastal habitats where fresh water from a river mixes with salt water from the sea. The estuary is a varied habitat where salinity, temperature, and other factors vary with change in tides. Organisms that live in the estuary must have wide tolerance ranges to survive.

Habitat: A place where an organism lives.

Permeability: It is the measure of relative ease with which water will flow through rock or soil.

River: A large stream of water flowing in a bed or channel and emptying into the ocean, a sea, or lake.

Salinity: The amount or concentration of salt dissolved in the water. Salinity is expressed by the amount of salt found in 1,000 grams of water. Therefore, if we have 1 gram of salt and 1,000 grams of water, the salinity is 1 part per thousand, or 1 ppt. The average ocean salinity is 35 ppt. This number varies between about 32 and 37 ppt.

Turbidity: Refers to how clear the water is. It is determined by measuring the total suspended solids i.e. soils, detritus) in the water column. The greater the number of total suspended solids the murkier the water that means that less sunlight penetrates to the bottom of the water.

Upland(s): High land; ground with land that is generally dry; as opposed to lowland, meadow, marsh, swamp, areas.

Watershed: The region draining into a river, river system, or other body of water.

Wetlands: A lowland area, such as a marsh or swamp that is saturated with moisture, especially when regarded as the natural habitat of wildlife.



SUNSHINE STATE STANDARDS ACTIVITY CORRELATIONS

Science

Processes that Shape the Earth

Standard 1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.(SC.D.1.2)

- SC.D.1.2.3 knows that the water cycle is influenced by temperature, pressure, and the topography of the land.
- SC.D.1.2.4 knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.
- SC.D.1.2.5 knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.

Processes of Life

Standard 1: The student describes patterns of structure and function in living things. (SC.F.1.2)

- SC.F.1.2.2 knows how all animals depend on plants.
- SC.F.1.2.3 knows that living things are different but share similar structures

Standard 2: The student understands the process and importance of genetic diversity. (SC.F.2.2)

- SC.F.2.2.1 knows that many characteristics of an organism are inherited from the parents of the organism, but that other characteristics are learned from an individual's interactions with the environment.

How Living Things Interact with Their Environment

Standard 1: The student understands the competitive, interdependent, cyclic nature of living things in the environment. (SC.G.1.2)

- SC.G.1.2.1 knows ways that plants, animals, and protists interact.
- SC.G.1.2.2 knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.
- SC.G.1.2.3 knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.
- SC.G.1.2.4 knows that some organisms decompose dead plants and animals into simple minerals and nutrients for use by living things and thereby recycle matter.
- SC.G.1.2.5 knows that animals eat plants or other animals to acquire the energy they need for survival.



- SC.G.1.2.6 knows that organisms are growing, dying, and decaying and that new organisms are being produced from the materials of dead organisms.
- SC.G.1.2.7 knows that variations in light, water temperature, and soil content are largely responsible for the existence of different kinds of organisms and population densities in an ecosystem.

The Nature of Science

Standard 1: The student uses the scientific processes and habits of mind to solve problems (SC.H.1.2)

- SC.H.1.2.1 knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.
- SC.H.1.2.2 knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results.
- SC.H.1.2.3 knows that to work collaboratively, all team members should be free to reach, explain, and justify their own individual conclusions.
- SC.H.1.2.4 knows that to compare and contrast observations and results is an essential skill in science.
- SC.H.1.2.5 knows that a model of something is different from the real thing, but can be used to learn something about the real thing.

Standard 2: The student understands that most natural events occur in comprehensible, consistent patterns. (SC.H.2.2)

- SC.H.2.2.1 knows that natural events are often predictable and logical.

Standard 3: The student understands that science, technology, and society are interwoven and interdependent. (SC.H.3.2)

- SC.H.3.2.2 know that data are collected and interpreted in order to explain an event or concept.
- SC.H.3.2.4 knows that through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.

Social Studies

People, Places, and Environments [Geography]

Standard 1: The student understands the world in spatial terms. (SS.B.1.2)

- SS.B.1.2.1 uses maps, globes, charts, graphs, and other geographic tools including map keys and symbols to gather and interpret data and to draw conclusions about physical patterns.
- SS.B.1.2.2 knows how regions are constructed according to physical criteria and human criteria



Standard 2: The student understands the interactions of people and the physical environment. (SS.B.2.2)

- SS.B.2.2.2 understands how the physical environment supports and constrains human activities.
- SS.B.2.2.3 understands how human activity affects the physical environment.
- SS.B.2.2.4 understands how factors such as population growth, human migration, improved methods of transportation and communication, and economic development affect the use and conservation of natural resources.

Math

Algebraic Thinking

Standard 2: the student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations. (MA.D.2.2)

- MA.D.2.2.1 represents a given simple problem situation using diagrams, models, and symbolic expressions translated from verbal phrases, or verbal translated from symbolic expressions etc.

Language Arts

Reading

Standard 2: The student constructs meaning from a wide range of texts. (LA.A.2.2)

- LA.A.2.2.1 reads text and determines the main idea or essential message, identifies relevant supporting details and facts, and arranges event in chronological order.
- LA.A.2.2.5 reads and organizes information for a variety of purposes, including making a report, conducting interviews, taking a test, and performing an authentic task
- LA.A.2.2.8 selects and uses a variety of appropriate reference materials, including multiple representations of information, such as maps, charts and photos, to gather information for research projects.

Writing

Standard 1: The student uses writing processes effectively. (LA.B.1.2.)

- LA.B.1.2.1 prepares for writing by recording thoughts, focusing on central idea, grouping related ideas, and identifying the purpose for writing.
- LA.B.1.2.2 Drafts and revises writing in cursive that: focuses on the topic; has logical organizational pattern, including a beginning, middle, conclusion, and transitional devices; has ample development of supporting ideas; demonstrates a sense of supporting ideas; demonstrates a sense of completeness or wholeness; demonstrates a command of language including precision in word choice; generally has correct subject/verb agreement; generally has correct verb and noun forms; with few exception, has sentences that are complete, expect when fragments are used purposefully;



- LA.B.1.2.3 uses a variety of sentence structures; and generally follows the conventions of punctuation, capitalization, and spelling.
- LA.B.1.2.3 produces final documents that have been edited for: correct spelling; correct use of punctuation, including commas in series, dates, and addresses, correct capitalization of proper nouns; correct paragraph indentation; correct usage of subject/verb agreement, verb and noun forms, and sentence structure; and correct formatting according to instructions.

Standard 2” The student writes to communicate ideas and information effectively. (LA.B.2.2)

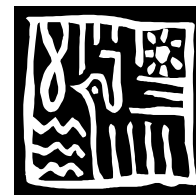
- LA.B.2.2.1 writes notes, comments, and observations that reflect comprehension of content and experiences from a variety of media.

Standard 3: The student uses speaking strategies effectively. (LA.C.3.2)

- LA.C.3.2.1 speaks clearly at an understandable rate and uses appropriate volume.
- LA.C.3.2.2 asks questions and makes comments and observations to clarify understanding of content processes, and experiences.
- LA.C.3.2.3 speaks for specific occasions, audiences, and purposes including conversations, discussions, projects, and informational or imaginative presentations.
- LA.C.3.2.4 uses eye contact and gestures that engage the audience.
- LA.C.3.2.5 participates as a contributor and occasionally acts as a leader in a group discussion.
- LA.C.3.2.6 organizes a speech using a basic beginning, middle, and ending.



Project Management Sheet for Habitat Detectives



Habitat Detectives

This worksheet is designed to help your group complete the *Watershed Detectives* project during one class period.

Directions:

1. Read the job descriptions below.
2. Decide as a team who will be the main project manager and the back-up project manager, if there is more than one volunteer the group will take a vote.
3. Each student will choose a scientific job. If more than one student wants to be the same scientist a compromise must be found. Also note that each student is a back up for another scientist. Place your names in the appropriate spaces.
4. Turn this sheet in to the teacher once you have chosen scientific jobs.

Zoologist (Identification of Animals): This teammate will sort all of the animal artifacts and pictures into the correct habitats. You will use animal guides and the habitat posters posted in the classroom. Beware some animals may be found in more than one habitat!

Name of main scientist

Name of back up scientist

Sedimentologist (Identification of Soils): This teammate will look at the prepared slides of soil samples. You will use a microscope, and information note cards to determine the correct habitat. You will also work with the Environmental Scientist to sort out the abiotic factors.

Environmental Scientist (Identification of Abiotic Factors): This teammate will sort out the abiotic factor clues. You will test the salinity (salt content) of water samples and identify sun exposure levels. You will also work with the Sedimentologist to sort out the soil types.

Botanist (Identification of Plants): This teammate will sort all of the plant artifacts and pictures into the correct habitats. You will use plant guides and the habitat posters posted in the classroom. Beware some plants may be found in more than one habitat! You will also work with the Zoologist to sort out the animals.

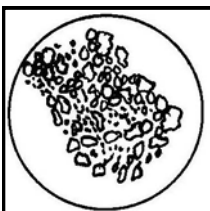
Project Manager (Lead Scientist- choose this job LAST): As the lead scientist you will be performing as one of the scientists below and will also have the responsibility of making sure that your other team of scientists completes their work and turns in their notes in readable format. You will have a back-up project manager work with you to make sure this task is complete. You must also speak with the teacher when any questions or disagreements arise.

Sedimentologist's Log

Habitat Detectives

Identification of Soil Types: Draw what you see.

Sediment	Permeability
Gravel	excellent
Sand	good to excellent
Silt	moderate
Clay	poor (impermeable)



Short Description: Tiny, mostly tan colored, some white and black pieces, sharp edges.
Permeability: good to excellent.

The River

Short Soils Description:

Permeability:

Drawing:

The Estuary

Short Soils Description:

Permeability:

Drawing:

The Pine Forest

Short Description:

Permeability:

Drawing:

The Hardwood Swamp

Short Description:

Permeability:

Drawing:

The Salt Marsh

Short Description:

Permeability:

Drawing:

The Beach

Short Description:

Permeability:

Drawing:

Environmental Scientist's Log

Habitat Detectives

Fill out the information for each habitat based on the information given to you in the abiotic factors cards and the water samples.

The River

Water: fresh brackish salt
(circle one)

Salinity (if applicable): _____ ppt

Sun Exposure/Turbidity:

Uplands: The Pine Forest

Water: fresh brackish salt
(circle one)

Salinity (if applicable): _____ ppt

Sun Exposure/Turbidity:

The Hardwood Swamp

Water: fresh brackish salt
(circle one)

Salinity (if applicable): _____ ppt

Sun Exposure/Turbidity:

The Salt Marsh

Water: fresh brackish salt
(circle one)

Salinity (if applicable): _____ ppt

Sun Exposure/Turbidity:

The Estuary

Water: fresh brackish salt
(circle one)

Salinity (if applicable): _____ ppt

Sun Exposure/Turbidity:

The Beach

Water: fresh brackish salt
(circle one)

Salinity (if applicable): _____ ppt

Sun Exposure/Turbidity:

Salinity Key

0 - 0.5 ppt	freshwater
0.5 - 17 ppt	brackish
32 - 37 ppt	salt

ppt= parts per thousand

Botanist's Log

Habitat Detectives

List the plants under the correct habitat. Remember some may be found in more than one location.

The River

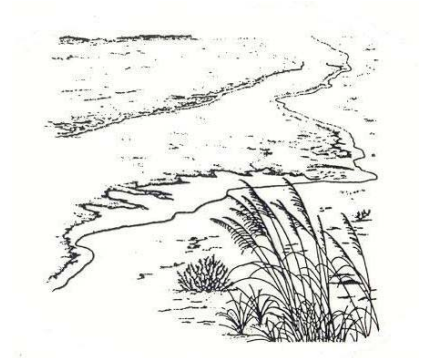
The Estuary

The Pine Forest

The Beach

The Hardwood Swamp

The Salt Marsh



Zoologist's Log

Habitat Detectives

List the animals under the correct habitat. Remember some may be found in more than one location.

The River

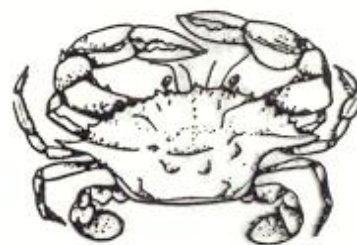
The Estuary

The Pine Forest

The Beach

The Hardwood Swamp

The Salt Marsh



Habitat Descriptions

Habitat Detectives

Group: _____

The River

Summarize all of the River information from each team member onto this sheet.

Abiotic Factors

Water Type: _____

Salinity: _____

Soil Type: _____

Soil Permeability: _____

Sunlight Exposure: _____

Plants:

Animals:



Habitat Descriptions

Habitat Detectives

Group:

The Estuary

Summarize all of the estuary information from each team member onto this sheet.

Abiotic Factors

Water Type: _____

Salinity: _____

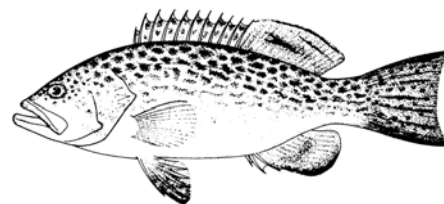
Soil Type: _____

Soil Permeability: _____

Sunlight Exposure: _____

Plants:

Animals:



Habitat Descriptions

Habitat Detectives

Group: _____

The Pine Forest

Summarize all of the pine forest information from each team member onto this sheet.

Abiotic Factors

Water Type: _____

Salinity: _____

Soil Type: _____

Soil Permeability: _____

Sunlight Exposure: _____

Plants:

Animals:



Habitat Descriptions

Habitat Detectives

Group:

The Hardwood Swamp

Summarize all of the hardwood swamp information from each team member onto this sheet.

Abiotic Factors

Water Type:_____

Salinity:_____

Soil Type:_____

Soil Permeability:_____

Sunlight Exposure:_____

Plants:

Animals:



Habitat Descriptions

Group: _____

Habitat Detectives

The Salt Marsh

Summarize all of the salt marsh information from each team member onto this sheet.

Abiotic Factors

Water Type: _____

Salinity: _____

Soil Type: _____

Soil Permeability: _____

Sunlight Exposure: _____

Plants:

Animals:



Habitat Descriptions

Group:

Habitat Detectives

The Beach

Summarize all of the beach information from each team member onto this sheet.

Abiotic Factors

Water Type: _____

Salinity: _____

Soil Type: _____

Soil Permeability: _____

Sunlight Exposure: _____

Plants:

Animals:

